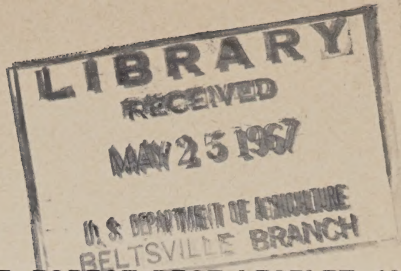


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## U.S. DEPARTMENT OF AGRICULTURE FOREST PEST LEAFLET 105

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# *Pine Sawfly* *Neodiprion excitans* *Roh.*

By Robert C. Thatcher <sup>1</sup>

The sawfly *Neodiprion excitans* Roh. is an important defoliator of pines in the South from Virginia to Texas. In recent years serious outbreaks have occurred in Florida and Texas. The insect feeds on most of the important species of southern pine. Since most of the defoliation occurs in late summer and early autumn, trees may go through the winter stripped of needles. The resulting loss in vigor may make the trees susceptible to attack by tree-killing bark beetles and wood boring insects.

### Hosts

In the Southeast and Texas, the preferred hosts of *Neodiprion excitans* are loblolly (*Pinus taeda* L.) and shortleaf (*P. echinata* Mill.) pines. Pond pine (*P. rigida* var. *serotina* (Michx.) Loud.) is also attacked. Slash (*P. elliottii* Englem.), longleaf (*P. palustris* Mill.), and Sonderegger (*P. × sondereggeri* H. H. Chapm.) pines occasionally are attacked, but larvae do not survive well on them, possibly because of heavy resin flow

from injured needles. The adults lay eggs mostly on medium to large trees in moderately to densely stocked forest stands (fig. 1). This sawfly attacks seedlings and saplings from time to time, often in association with the red-headed pine sawfly, *N. lecontei* (Fitch).

### Damage

Newly hatched larvae feed close together; often three to five encircle each needle. They eat the outer tissue of a needle at or near the tip, leaving a central light-colored core that gives the affected branch an abnormal appearance. The uneaten part of the needle yellows slightly in the vicinity of feeding, but dead branch terminals—flagging—cannot be discerned.

More advanced larvae feed singly or in pairs on a single needle. They prefer older foliage and often eat most of the needle, leaving only a short stub. Sometimes the bases of needles are eaten first, causing some falling of green needles. When the needles have been removed from a branch, the larvae migrate in groups to other branches or trees.

Since the insect is most active during late summer or fall, heavily infested trees may remain without needles throughout the winter. No

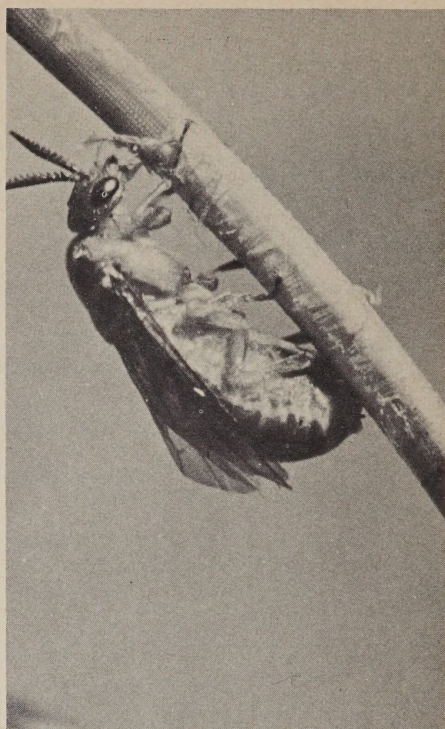
<sup>1</sup> Research entomologist, Southern Forest Experiment Station, Forest Service, U.S. Department of Agriculture. Assigned to the Station's field office in Alexandria, La.





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Figure 1.—Heavy sawfly defoliation of loblolly pine.



F-514387

Figure 2.—Adult female of *Neodiprion excitans* Roh.

tree mortality resulting directly from needle loss has been reported, nor has the effect on tree growth been determined. However, severe defoliation causes weakening of trees and susceptibility to attack by bark beetles, especially *Ips* spp. Light loss of older needles early in the season gives the crown a "tufted" or thinned look. New growth usually restores normal appearance of the trees.

### Description

The adult female is about  $\frac{3}{8}$  inch long, and has a heavy, brownish body and brownish to black thread-like antennae (fig. 2). The side margins of the thorax and abdomen are dirty white. The male is about  $\frac{1}{4}$  inch long and has a black body and feathery antennae. The adults are flylike in appearance but have four shiny, transparent wings.

Newly hatched larvae are about  $\frac{1}{8}$  inch long and have dull black heads and graphite-gray bodies. When feeding starts, the head becomes glossy black and the body yellow green to green. Older larvae also have glossy black heads, but the body is olive green. Two longitudinal black stripes on the back, a large black spot on the top of the last abdominal segment, and a row of conspicuous black spots on each side of the body distinguish this species from other sawfly larvae (fig. 3). Fully grown larvae are about 1 inch long.

The cocoon is a tough, light to dark brown, oval capsule, sometimes slightly curved, and varying from  $\frac{1}{4}$  to  $\frac{3}{8}$  inch long. Cocoons containing females are generally larger than those containing males.





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Figure 3.—Late-instar larva of *Neodiprion excitans* Roh. feeding on loblolly pine needle.

### Life History and Habits

Egg laying begins in late March and continues at irregular intervals throughout the warm season. As many as 184 eggs have been found in the ovaries of a single female. Eggs are deposited in needles closest to the tips of exposed shoots during cool spring and fall weather and in shaded shoots during hot weather. Females prefer places where needles are growing most rapidly and needles that have just completed their growth, next to a bud. Peak egg laying occurs in July or August in east Texas, and from late August to early October in the Southeast.

One egg is inserted by the female into a small slit cut near the base of the needle. Where more eggs than one are found in a needle, different females probably laid them.

Eggs incubate in 10 to 21 days. The larvae feed for approximately 5 weeks, changing to paler, nonfeeding prepupal larvae, which spin cocoons.

Cocoons usually occur in the surface duff or loose topsoil beneath trees that have lost many needles, but may be found on twigs or needles or beneath loose bark scales. Typically, the prepupa undergoes a diapause or resting stage, of a few weeks to many months. The pupal period lasts 2 or 3 weeks.

Peak emergence occurs late in the warm season, but adults emerge from cocoons at almost any time during spring and summer. Consequently, all stages of development on infested trees may be found, particularly during the late summer or early autumn. Under best conditions, a generation may be completed in 8 weeks, and four to five generations may occur each year. Most of the insects overwinter in cocoons, but a few persist as eggs or older larvae.

### Natural Control

Outbreaks of *Neodiprion excitans* occur every few years and usually subside after one season. Hogs, armadillos, mice, and shrews destroy cocoons and greatly help to control outbreaks. Larval virus diseases provide natural control, as do at least 13 species of insect parasites and predators that feed on the sawfly during all its life stages.

Low winter temperatures do not appear to aid in control. An overnight low of 16° F. in Florida caused larvae to stop eating, but they renewed feeding when the temperature rose.

### Direct Control

When needles are removed repeatedly, especially in dry weather, so that the tree is in danger of dying or is susceptible to attack by bark beetles, insecticidal control may be justified. DDT has been used suc-



cessfully in controlling outbreaks of other species of sawflies and forest defoliators.

In 1959 an area in Texas was aerially sprayed with DDT to avoid risking a southern pine beetle invasion of trees weakened by 2 consecutive years of defoliation by *Neodiprion excitans*. Frequently direct control has been unnecessary because serious defoliation has been limited to a single year, and natural controls have been highly effective. The threat of this insect to maturing even-aged plantations of susceptible species is not yet known.

Aerial applications of 1 pound of DDT per gallon of light fuel oil per acre should be effective.

**Caution:** Use DDT only if there is a serious threat of tree mortality. Apply and handle pesticide with care. Follow directions and heed all precautions on the container label. In forest spraying avoid streams, ponds, lakes, and areas of special land use. If pesticides are handled or applied carelessly or if unused portions are disposed of improperly, they may be injurious to

humans, domestic animals, desirable plants, honey bees and other pollinating insects, fish, and wildlife. Also, they may contaminate water supplies.

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